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HEREON IS AN ACKNOWLEDGEMENT THAT ON THIS DATE THE  
PATENT & TRADEMARK OFFICE RECEIVED:

- ☒ Utility Patent Transmittal (1 page)
- ☒ Fee Transmittal (in duplicate) (1 page)
- ☒ Check No. 4752 in the amount of \$1470.00
- ☒ Specification including Claims and Abstract (27 pages)
- ☒ Drawings (16 sheets)
- ☒ Declaration and Power of Attorney (3 pages)
- ☒ Assignment and Recordation Cover Sheet (3 pages)
- ☒ Check No. 4753 in the amount of \$40.00 Recordation Fee
- ☒ Information Disclosure Statement (3 pages)
- ☒ Form 1449 or PTO/SB/08 (2 pages; with attached references)

22241 U.S. PTO

10/633025



08/01/03

Invention: APPARATUS AND METHODS FOR FORMING COMPOSITE  
STIFFENERS AND REINFORCING STRUCTURES

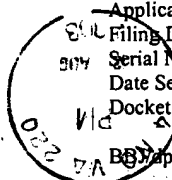
Applicant(s): Benson et al.

Filing Date: August 1, 2003

Serial No.: To be assigned

Date Sent: August 1, 2003 via Express Mail Label No. EV325772746US

Docket No: 2507-5936US



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**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:**

Benson et al.

**Serial No.:** Not Yet Assigned

**Filed:** August 1, 2003

**For:** APPARATUS AND METHODS FOR  
FORMING COMPOSITE STIFFENERS  
AND REINFORCING STRUCTURES

**Confirmation No.:** Unknown

**Examiner:** Unknown

**Group Art Unit:** Unknown

**Attorney Docket No.:** 2507-5936US  
(22025-US)

**NOTICE OF EXPRESS MAILING**

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Date of Deposit with USPS: August 1, 2003

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**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In compliance with the duty to disclose information material to patentability pursuant to 37 C.F.R. § 1.56, it is respectfully requested that this Information Disclosure Statement be entered and the documents listed on attached Form PTO-1449 or PTO/SB/08 be considered by the Examiner and made of record. Copies of the listed documents are enclosed pursuant to 37 C.F.R. § 1.98(a).

In accordance with 37 C.F.R. § 1.97(g) and (h), filing of this Information Disclosure Statement is not to be construed as a representation that a search has been made or an admission that the information cited herein is, or is considered to be, material to patentability as defined in

37 C.F.R. § 1.56(b). Further, no representation is made by Applicants herein that no other possible material information as defined in 37 C.F.R. § 1.56(b) exists.

U.S. Patent Documents

<u>U.S. Patent No.</u>	<u>Publication Date</u>	<u>Patentee</u>
US - 2,938,566	05/31/1960	Toulmin, Jr.
US - 2,979,431	04/11/1961	Perrault
US - 4,559,005	12/17/1985	Gants et al.
US - 4,946,526	08/07/1990	Petty-Galis et al.
US - 5,026,447	06/25/1991	O'Connor
US - 5,043,128	08/27/1991	Umeda
US - 5,076,873	12/31/1991	Lowery
US - 5,137,071	08/11/1992	Ashton et al.
US - 5,182,060	01/26/1993	Berecz
US - 5,211,901	05/18/1993	Fray
US - 5,451,377	09/19/1995	Asher et al.
US - 5,484,277	01/16/1996	Lindsay
US - 5,502,886	04/02/1996	Jensen et al.
US - 5,538,589	07/23/1996	Jensen et al.
US - 5,639,410	06/17/1997	Amaike et al.
US - 5,681,513	10/28/1997	Farley
US - 5,707,576	01/13/1998	Asher
US - 5,820,804	10/13/1998	Elmaleh
US - 5,891,379	04/06/1999	Bhattacharyya et al.
US - 6,355,133 B1	03/12/2002	Williams
US - 2002/0144401 A1	10/10/2002	Nogueroles Vines et al.

Foreign Patent Documents

<u>Document No.</u>	<u>Publication Date</u>	<u>Patentee</u>
WO 99/52698	10/21/1999	Reis et al.
WO 00/37244	06/29/2000	Williams

Other Documents

Composite Systems, Inc., PFE\_Technology,

<http://www.compositemfg.com/PFE%20Technology.htm>, 2003, 3 pages.

Applicants offer to supply any explanation or discussion of the documents that the Examiner feels is necessary or desirable and which is requested.

This Information Disclosure Statement is filed within three (3) months of the filing date of the above-identified application, and no certification pursuant to 37 C.F.R. § 1.97(c) or a fee pursuant to 37 C.F.R. § 1.17(p) is required.

Respectfully submitted,



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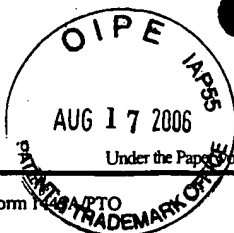
Date: August 1, 2003

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Enclosures: Form PTO-1449 or PTO/SB/08

Cited Documents

Document in ProLaw



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PTO/SB/08B(10-01)

Approved for use through 10/31/2002. OMB 0651-0031

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## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(use as many sheets as necessary)

Sheet 2 of 2

**Complete if Known**

Application Number	Not Yet Assigned
Filing Date	August 1, 2003
First Named Inventor	Benson et al.
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	2507-59361US (22025JIS)

**OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS**

Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		Composite Systems, Inc., PFE_Technology, <a href="http://www.compositemfg.com/PFE%20Technology.htm">http://www.compositemfg.com/PFE%20Technology.htm</a> , 2003, 3 pages.	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

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***Composite Systems***

Aerospace, Automotive, Industrial and Marine

PFE Technology

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Composite Systems, Inc. provides "turn-key" solutions for the aerospace, automotive, industrial and marine industries worldwide....

Composite Systems, Inc. has been working closely with aerospace and marine designers, engineers and manufacturers. Our goal is to provide improved, cost effective, methods to produce quality, repeatable composite components.

With that in mind, Composite Systems, Inc. has developed and has **patents pending and applied for** work that performs the layup of composite materials from the end of commercially available robots. This offers

- be set up to run pre-preg, semi-preg and 'dry' composite materials used in either conventional, RTI
- perform layup of both unidirectional and woven materials in excess of 100M modulus
- layup material from 2.00" (51 mm) to 60.00" (1524 mm) in width
- be manufactured in 6.00" (152 mm) 'nominal' module increments at the factory as standard
- custom configurations are available upon request - contact the factory
- perform both ID (inside dimension) and OD (outside dimension) layup
- perform inverted layup - material/process specific
- perform 'de-bulking' during the layup regime - the suspension system provides for 100% contact with
- 'profile' (cut) the material edge or edges as it is being dispensed
- remove the protective 'films' from the material as it is being dispensed
- capture waste during the 'profiling' regime
- dispenses and 'squeegees' resin during the layup (wet layup configuration)
- layup material at speeds in excess of 1000 ipm (25.4 mpm) regardless of roll width - conditional to
- control the temperature of the material by incorporating (optional) 'non-condensing' refrigeration for
- 'absorb' plug or molds containing concave, convex and/or spline surface geometry
- layup material over various cores and foams
- be equipped to dispense 'bagging' materials

Composite Systems, Inc. manufactures 'standard' track and gantry systems that may be configured with

- a 'tool crib' with multiple PFE devices, configured for a variety of material types, thicknesses, width
- 'grippers' to place core materials and 'imbeds'
- portable UV and IR panels for curing
- additional coordinated axis 'head and tail stock' positioners - to manipulate molds/plugs

With 'Cylinder Cell' systems, the PFE is comprised of multiple PFE modules connected together along the tool. It works in concert with the (Z) axis, providing vertical travel to the tool.

**(Note: Protective Covers Removed for Clarity)**

# Systems, Inc.

## Marine Robotic Systems Integration

## Technology

Manufacturers as well as composite materials suppliers, to develop advanced methods of composite material handling and layup. Our structures to the aerospace, automotive, marine and related industries.

vide regarding a new technology. 'Precision Feed Endeffector' (PFE) technology incorporates specially designed endeffector tooling significant advantages over conventional ATL (automatic tape laying) machines in several ways. The PFE device can:

'wet layup' processes

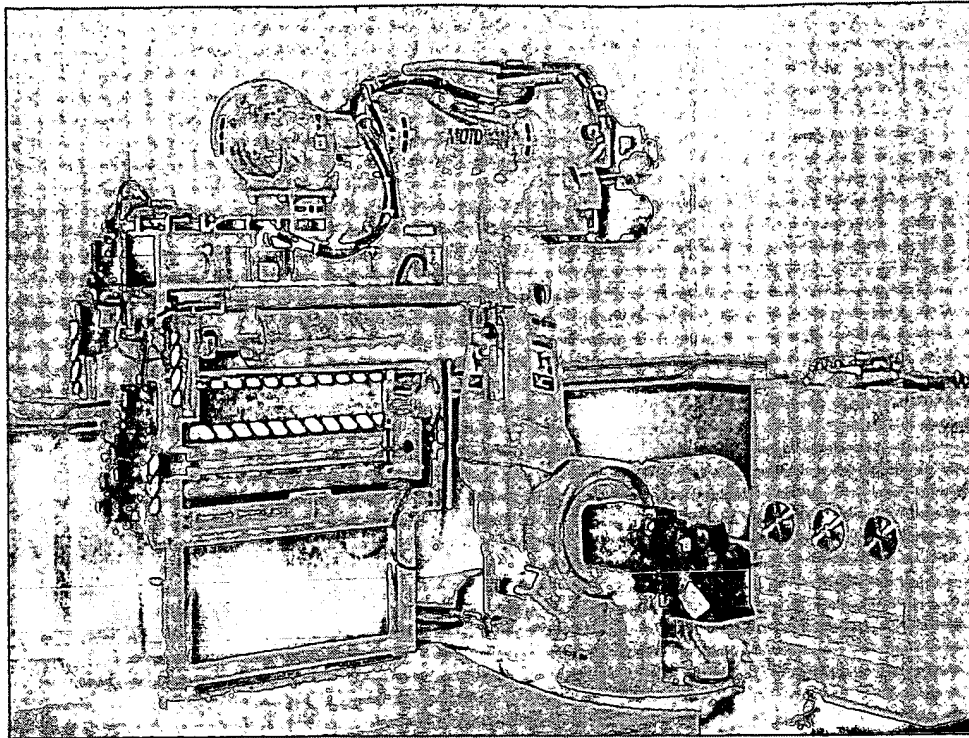
the surface of the mold

material and robot system implemented  
supply roll and thermostatically controlled 'warm air' (optional) when and if required

more than one robot. With the use of 'quick-change' wrists, these robot 'cells' may also include the following:

and bagging materials

entry bottom incorporating addition 'second tier' suspension to accommodate shape change along the long axis (X) of the part. This



Motoman UP200 robot with 24.00" (610 mm) PFE set up for prepeg material. System partially extended.

The provided video clips are of the PFE system performing layup of 24.00" (610 mm) woven carbon fiber

### Option 1

For those using **Real Player 1** download the current version and view the video links below at a minimum

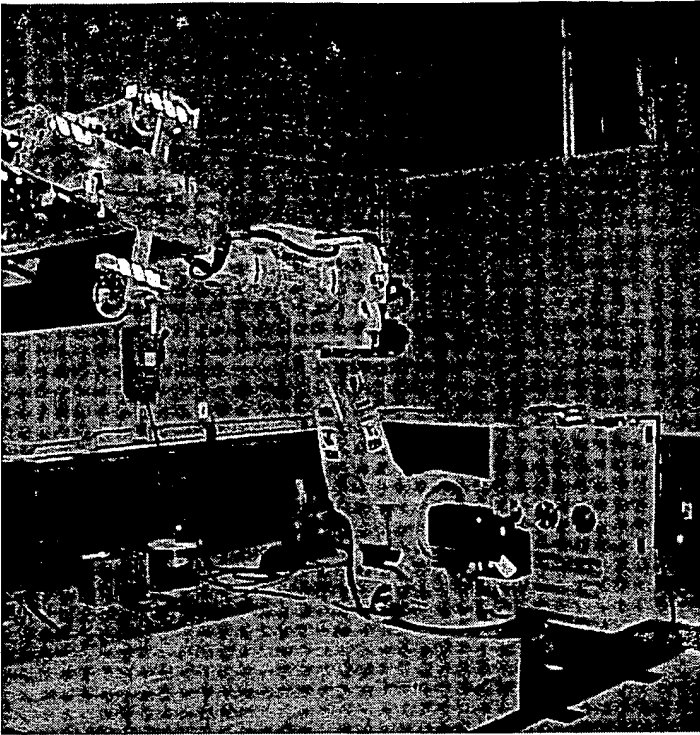
**Video** of 0 degree layup.    **Video** of 90 degree layup.

### Option 2

To watch the videos, a minimum of a *28.8k connection* speed is required. You will also need to make sur

**Video** of 0 degree layup.    **Video** of 90 degree layup.

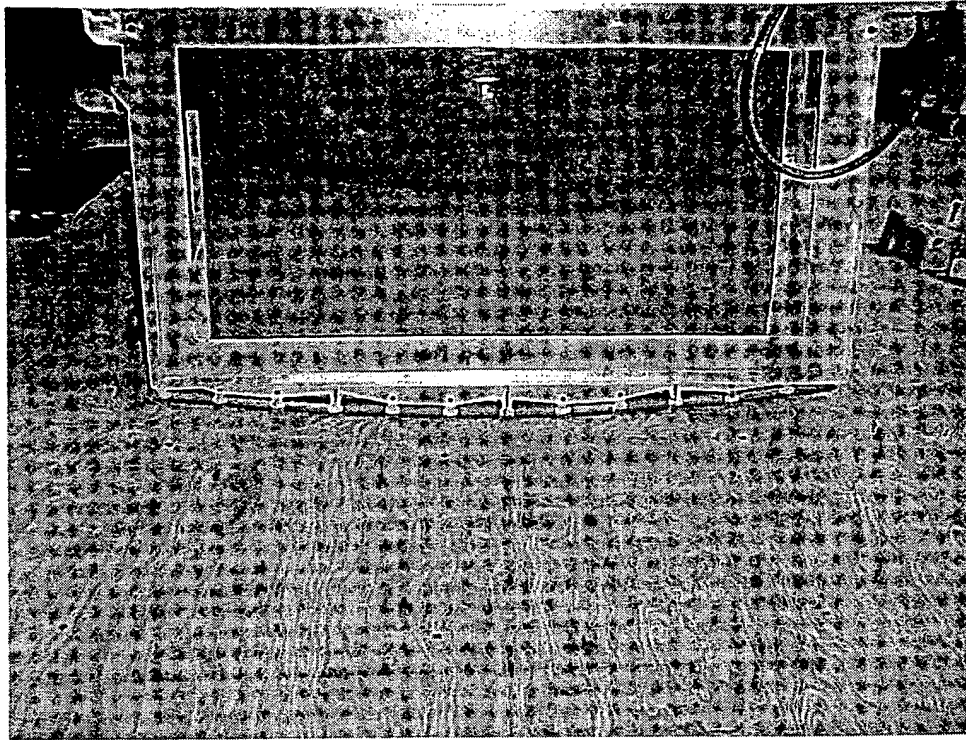




reg material at 200" ipm (5080 mm/pm) over a honeycomb core.

*connection* or higher.

t you have the latest Windows Media Player 9 for viewing from Windows 98, 98SE, Me, 2000 and XP,



PFE layup system conforming to concave surface geometry.



PFE system equipment

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For more information please visit our [Information](#) page.

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with refrigeration equipment. (optional)

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